

CLAIMS

What is claimed is:

- 1) A computer system operation method for use with a CAD system in modeling objects, said method providing a means for identifying geometric cells of a model, the method comprising:
receiving input comprising one or more constraints relating to cell information;
for each constraint, determining whether the cell meets the requirement of the constraint; and
generating a list of cells meeting the requirements of the constraints.
- 2) The computer system operation method of claim 1, wherein the constraints are chosen from a group comprising:
 - a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;
 - c) constraints relating to the history of the model evolution;
 - d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 3) A CAD/CAM apparatus comprising:
an input device;
a central processing unit; and
a display device;
wherein the central processing unit runs an application program comprising code for:
displaying a representation of a model;
receiving input comprising one or more constraints relating to cell information of the model;
for each constraint, determining which cells of the model meet the requirement of the constraint; and

generating a list of cells meeting all of the requirements of the constraints.

- 4) The CAD/CAM apparatus of claim 3, wherein the application program processes constraints chosen from a group comprising:
 - a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;
 - c) constraints relating to the history of the model evolution;
 - d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 5) A computer data signal embodied in a digital data stream comprising data representing the identity of one or more geometric cells of a model, wherein said data stream is generated by a system operating according to a method comprising: receiving input comprising one or more constraints relating to cell information; for each constraint, determining which cells of the model meet the requirement of the constraint; and
generating a list of cells meeting all of the requirements of the constraints.
- 6) The computer data signal embodied in a digital data stream of claim 5, wherein said constraints used in said method are chosen from a group comprising:
 - a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;
 - c) constraints relating to the history of the model evolution;
 - d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 7) Computer executable code stored on a computer readable medium, the code comprising means for causing a CAD computer system to perform a method providing a means for identifying geometric cells of a model, the method comprising:
receiving input comprising one or more constraints relating to cell information;

for each constraint, determining which cells of the model meet the requirement of the constraint; and
generating a list of cells meeting all of the requirements of the constraints.

- 8) Computer executable code stored on a computer readable medium according to claim 7, wherein said constraints used in said method are chosen from a group comprising:
 - a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;
 - c) constraints relating to the history of the model evolution;
 - d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 9) A computer system operation method for use with a CAD system in modeling objects, said method providing a means for identifying geometric cells of a model, the method comprising:
 - a) receiving input comprising one or more constraints relating to cell information;
 - b) selecting the first constraint of said input and identifying the components of the CAD system that must be accessed to find geometric cells meeting the requirements of the constraint;
 - c) searching the cells of the model and retaining as a subset only the cells that meet the requirement of the first constraint of said input;
 - d) selecting the next constraint of said input and identifying the components of the CAD system that must be accessed to find geometric cells meeting the requirements of said next constraint;
 - e) searching the subset of cells and retaining in the subset only the cells that meet the requirement of said next constraint of said input; and
 - f) repeating steps d) and e) for each of the remaining constraints in said input.

- 10) The computer system operation method of claim 9, wherein the constraints are chosen from a group comprising:
- a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;
 - c) constraints relating to the history of the model evolution;
 - d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 11) A CAD apparatus comprising:
- an input device; and
 - a central processing unit;
- wherein the central processing unit runs an application program comprising code for:
- a) receiving input comprising one or more constraints relating to cell information of a model;
 - b) selecting the first constraint of said input and identifying the components of the CAD system that must be accessed to find geometric cells meeting the requirements of the constraint;
 - c) searching the cells of the model and retaining as a subset only the cells that meet the requirement of the first constraint of said input;
 - d) selecting the next constraint of said input and identifying the components of the CAD system that must be accessed to find geometric cells meeting the requirements of said next constraint;
 - e) searching the subset of cells and retaining in the subset only the cells that meet the requirement of said next constraint of said input; and
 - f) repeating steps d) and e) for each of the remaining constraints in said input.
- 12) The CAD apparatus of claim 11, wherein the application program processes constraints chosen from a group comprising:
- a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;

- c) constraints relating to the history of the model evolution;
 - d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 13) A computer data signal embodied in a digital data stream comprising data representing the identity of one or more geometric cells of a model, wherein said data stream is generated by a system operating according to a method comprising:
- a) receiving input comprising one or more constraints relating to cell information;
 - b) selecting the first constraint of said input and identifying the components of the CAD system that must be accessed to find geometric cells meeting the requirements of the constraint;
 - c) searching the cells of the model and retaining as a subset only the cells that meet the requirement of the first constraint of said input;
 - d) selecting the next constraint of said input and identifying the components of the CAD system that must be accessed to find geometric cells meeting the requirements of said next constraint;
 - e) searching the subset of cells and retaining in the subset only the cells that meet the requirement of said next constraint of said input; and
 - f) repeating steps d) and e) for each of the remaining constraints in said input.
- 14) The computer data signal embodied in a digital data stream of claim 13, wherein said constraints are chosen from a group comprising:
- a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;
 - c) constraints relating to the history of the model evolution;
 - d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 15) Computer executable code stored on a computer readable medium, the code comprising means for causing a CAD computer system to perform a method

providing a means for identifying geometric cells of a model, the method comprising:

- a) receiving input comprising one or more constraints relating to cell information;
- b) selecting the first constraint of said input and identifying the components of the CAD system that must be accessed to find geometric cells meeting the requirements of the constraint;
- c) searching the cells of the model and retaining as a subset only the cells that meet the requirement of the first constraint of said input;
- d) selecting the next constraint of said input and identifying the components of the CAD system that must be accessed to find geometric cells meeting the requirements of said next constraint;
- e) searching the subset of cells and retaining in the subset only the cells that meet the requirement of said next constraint of said input; and
- f) repeating steps d) and e) for each of the remaining constraints in said input.

- 16) Computer executable code stored on a computer readable medium according to claim 15, wherein said constraints used in said method are chosen from a group comprising:
 - a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;
 - c) constraints relating to the history of the model evolution;
 - d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 17) A computer system operation method for use with a CAD system in modeling objects, said method providing a means for specifying geometric cells of a model that a user wishes to be a target for modification or manipulation, the method comprising specifying one or more constraints chosen from the group comprising:
 - a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;

- c) constraints relating to the history of the model evolution;
 - d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 18) A computer system operation method for use with a CAD system in modeling objects, said method providing a means for identifying geometric cells of a model meeting the requirement of one or more constraints of a cell descriptor, the method comprising:
- determining for each constraint of said cell descriptor those components of the CAD system that must be accessed to find geometric cells meeting the requirements of the constraint; and
- identifying a list of geometric cells that meet the requirements of all of the constraints of said input.
- 19) A computer system operation method for use with a CAD system in modeling objects, said method providing a means for defining three dimensional objects using a textual description, the method comprising:
- receiving textual input specifying one or more pre-defined geometric parts, and the location and size of such parts;
- generating geometric cell information for such parts;
- receiving input comprising one or more constraints relating to the cell information of such parts;
- for each constraint, determining whether the cells of such parts meet the requirements of the constraint; and
- generating a list of cells meeting the requirements of the constraints.
- 20) The computer system operation method of claim 19, wherein the constraints are chosen from a group comprising:
- a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;
 - c) constraints relating to the history of the model evolution;

- d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 21) Computer executable code stored on a computer readable medium, the code comprising means for causing a CAD computer system to perform a method providing means for defining three dimensional objects using a textual description, the method comprising:
- receiving textual input specifying one or more pre-defined geometric parts, and the location and size of such parts;
 - generating geometric cell information for such parts;
 - receiving input comprising one or more constraints relating to the cell information of such parts;
 - for each constraint, determining whether the cells of such parts meet the requirements of the constraint; and
 - generating a list of cells meeting the requirements of the constraints.
- 22) Computer executable code stored on a computer readable medium according to claim 21, wherein said constraints used in said method are chosen from a group comprising:
- a) constraints relating to cell dimension;
 - b) constraints relating to the topology of a cell;
 - c) constraints relating to the history of the model evolution;
 - d) constraints relating to specific attributes of a cell; and
 - e) constraints relating to geometrical indications of a cell.
- 23) A method of identifying geometric cells in a CAD/CAM system, the method comprising the following steps:
- creating a set of scripting rules for describing one or more characteristics of geometrical cells in said CAD/CAM system;
 - receiving a user script input describing one or more characteristics of the geometrical cells to be identified, said user input using said set of scripting rules;

interpreting said user input for translating said described characteristics into one or more cell selecting commands;
selecting the cells that meet all the described characteristics, using said cell selecting commands.